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**TRANSLATION FROM JAPANESE**

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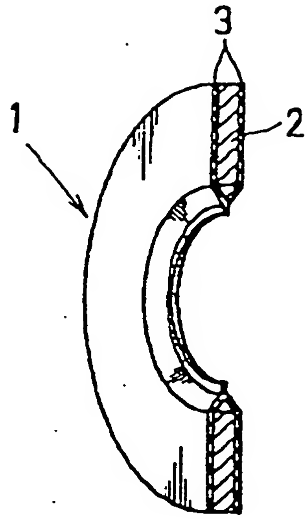
(54) [ Title of the Invention ] **Jacket Gasket**

(57) [ Abstract ]
[ Object ] To provide a jacket gasket with which the sealing precision can be enhanced in a lined flange having local irregularities.
[ Structure ] Characterized by being a jacket gasket in which the outer periphery of a core composed of low-density porous polytetrafluoroethylene that has been fibrillated and has a density of 1.8 or less is covered with a sheath composed of high-density sintered polytetrafluoroethylene.

1 and 4: jacket gaskets
2 and 7: cores
3 and 8: sheaths
5: sheeting
6: metal sheet




[ Claims ]

[ Claim 1 ] A jacket gasket in which the outer periphery of a core composed of low-density porous polytetrafluoroethylene that has been fibrillated and has a density of 1.8 or less is covered with a sheath composed of high-density sintered polytetrafluoroethylene.

Detailed Description of the Invention

[ 0001 ]

Field of Industrial Utilization

The present invention relates to a jacket gasket that is effective in the sealing of a flange in piping or a fluid device or of a vessel lid, and particularly a flange that has been lined with a fluororesin, glass, or rubber.

[ 0002 ]

Prior Art

In the past, the above-mentioned jacket gaskets included the following: as shown in Figure 7, a first conventional jacket gasket 14, in which a core 12 formed from a joint sheet such as a rubber sheet or asbestos felt is covered with a sheath 13 formed from sintered PTFE (polytetrafluoroethylene is abbreviated as PTFE herein); as shown in Figure 8, a second conventional jacket gasket 19, in which a high-strength ring 15 of asbestos cloth, a corrugated metal joint sheet, or the like is sandwiched between two sheets of asbestos felt 16, and the resulting core 17 is covered with a sheath 18 formed from sintered PTFE; and as shown in Figure 9, a third conventional

jacket gasket 22, in which a sheath 21 formed from porous PTFE is adhesively bonded or grommeted to the surface or the inside diameter portion of a core 20 formed from sintered PTFE.

[ 0003 ]

Problems Which the Invention is Intended to Solve

However, when the above-mentioned jacket gaskets 14, 19, and 22 are used for the seal of a PTFE-lined flange (not shown), because the cores 12, 17, and 20 comprised by the jacket gaskets 14, 19, [and 22], respectively, have extremely low compression (see Figure 5), if the butt weld portions of the PTFE lining layer protrude locally, then there will be poor conformity with the lining butt weld portions and other such flange surfaces having local irregularities, which means that it will be extremely difficult to ensure a good seal for flanges having irregularities, which is a problem in that the sealing precision of the flange cannot be increased.

[ 0004 ] Meanwhile, when [these jacket gaskets] are used for the seal of a rubber-lined flange (not shown), the rubber lining layer moves and deforms in the planar direction during sealing (see Figure 6), and if this deformation exceeds the elongation at break of the cores 12 and 17 comprised by the jacket gaskets 14 and 19, respectively, then the cores 12 and 17 will not be able to keep up with the deformation, resulting in breakage, cracking, and the like. Specifically, the breakage of the cores 12 and 17 comprised by the jacket gaskets 14 and 19 causes large amounts of leakage, and trickle leaks also occur from the grommeted portions of the sheath 21 comprised by the jacket gasket 22. Further, chlorine gas, fluorine gas, hydrochloric acid, and other such sealed fluids permeate to varying degrees through the sheaths 13 and 18 comprised by the jacket gaskets 14 and 19, so the cores 12 and 17 can be corroded by sealed fluids if the latter are corrosive. Also, conformity and the coefficient of friction can be improved with asbestos felt and asbestos cloth, but these materials tend to produce dust, and cannot be used in places that must be kept clean, whereas the problem with using porous PTFE by itself is that permeation leakage occurs.

[ 0005 ] In light of the above problems, an object of the present invention is to provide a jacket gasket with which the above problems can be solved by covering the core composed of low-density porous PTFE comprised by the jacket gasket with a sheath composed of high-density sintered PTFE.

[ 0006 ]

Means Used to Solve the Above-Mentioned Problems

The present invention is characterized by being a jacket gasket in which the outer periphery of a core composed of low-density porous polytetrafluoroethylene that has been fibrillated and has a density of 1.8 or less is covered with a sheath composed of high-density sintered polytetrafluoro-ethylene.

[ 0007 ]

Merits of the Invention

With the present invention, since the core of the jacket gasket is formed from porous PTFE, and since porous PTFE has more than twice the compression of a joint sheet or PTFE alone (see Table 2), the initial compression during sealing can be set higher, and since the core formed from porous PTFE deforms in the planar direction while holding a load, compliance is greater than with a joint sheet, but is less than with PTFE alone, so there is no breakage, cracking, or the like during sealing, the lining butt weld portions and the like conform better to flange surfaces having local irregularities, a good seal can be ensured with flanges having irregularities, and the sealing precision of the flange can be increased.

[ 0008 ] Furthermore, since low-density porous PTFE is used together with high-density sintered PTFE, corrosion by gas permeation, dust generation, and other such problems encountered in the past are absent, which means that this combination of materials is effective for sealing in places that must be kept clean. Also, since the entire gasket is covered with high-density sintered PTFE, the permeation leakage of the sealed fluid can be effectively prevented.

[ 0009 ]

Practical Examples

A first practical example of the present invention will be described through reference to the figures. Figures 1 and 2 illustrate a jacket gasket used in the seal of a flange lined with PTFE or rubber. This jacket gasket 1 is produced by drawing low-density porous PTFE into a sheet to fibrillate it, then punching out this porous PTFE sheet in the form of a ring to form a core 2 (density: 0.8; inside diameter: 124 mm; outside diameter: 156 mm; thickness: 3 t), and covering both sides of this core 2 composed of porous PTFE with a sheath 3 composed of high-density sintered PTFE

(density: 2.15; inside diameter: 124 mm; outside diameter: 156 mm; thickness: 0.5.[1]

[ 0010 ] The jacket gasket 4 shown in Figure 3 is a second practical example, and is produced by punching out a porous PTFE sheet into a ring shape to form two sheets 5 (density: 0.8; inside diameter: 124 mm; outside diameter: 156 mm; thickness: 2 t), integrally sandwiching a metal sheet 6 made of SUS 304 (inside diameter: 124 mm; outside diameter: 156 mm; thickness: 0.2) between these sheets 5 to form a core 7, then covering both sides of this core 7 with a sheath 8 composed of sintered PTFE (density: 2.15; inside diameter: 124 mm; outside diameter: 156 mm; thickness: 0.5).

[ 0011 ] The jacket gasket 9 shown in Figure 4 is a third practical example, and is produced by punching out a porous PTFE sheet into a ring shape to form a core 10,[2] locally press molding both sides of this core 10 to form concentric, circular, annular protrusions 10a and 10b, one on each side, then covering both sides of this core 10 with a sheath 11 composed of sintered PTFE.

[ 0012 ] Three samples were formed in the same shape and size and subjected to a performance test under the same conditions, and served as comparative examples of the above jacket gaskets 1, 4, and 9: test product A, which was formed with the same structure as the jacket gasket 1 in the first practical example (see Figure 2); test product B, which was formed with the same structure as the jacket gasket 14 in the second practical example (see Figure 5); and test product C, which was formed with the same structure as the jacket gasket 22 in the third practical example (see Figure 7). Specifically, each of the test products A, B, and C was set in the PTFE-lined portion (not shown) or the rubber-lined portion (not shown), a load was placed on each of the test products A, B, and C at a tightening surface pressure of 300 $kg/cm^2$, and $N_2$ gas was introduced at 10.5 $kg/cm^2$.

[ 0013 ] Table 1 below gives the results of the performance test conducted for the test products A, B, and C under the above conditions.

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[1] Translator's note: No unit given.

[2] Translator's note: "2" in the original; probable typo.

[ 0014 ] **Table 1**

| Sample (JIS 100 × 100 A use) | Flange | When tightening surface pressure was 300 $kg/cm^2$ and $N_2$ gas was introduced at 10.5 $kg/cm^2$ |
|---|---|---|
| Test product A | PTFE-lined flange (with 1 mm protrusion at PTFE lining butt weld portion) | No leakage |
| Test product B | | Spray leakage near protrusion on flange |
| Test product C | | Bubble leakage near protrusion on flange and at 90° |
| Test product A | Rubber-lined flange | No leakage |
| Test product B | | Much leakage due to breakage of joint sheet of core |
| Test product C | | Trickle leakage from porous PTFE grommet |

[ 0015 ] First, when the test products A, B, and C are compared when set in the PTFE-lined flange, as shown in Figure 5, because of the extremely low compression of the joint sheet and the PTFE alone comprised by the conventional test products B and C, if the butt weld portions of the PTFE lining protrude locally, as they do in a PTFE-lined flange, then the joint sheet and the PTFE alone cannot conform to the local protrusions, and spray leakage, bubble leakage, and the like occur in the vicinity of the protrusions. However, because the compression of the porous PTFE comprised by the proposed test product A is approximately four times that of the joint sheet and approximately three times that of PTFE alone, the lining butt weld portions and the like conform well to flange surfaces having local irregularities, no leakage occurs, a good seal can be ensured for flanges having irregularities, and the initial compression can be set higher.

[ 0016 ] Next, when the test products A, B, and C are compared when set in the rubber-lined flange, as shown in Figure 6, because movement and deformation occur in the planar direction when the rubber lining layer of the rubber-lined flange is pressed, if this deformation exceeds the elongation at break of the cores of the test products B and C, then much leakage occurs as a result of breakage of the joint sheet comprised by the test product B, and trickle leakage occurs at the grommeted portions of the porous PTFE comprised by the test product C, but the porous PTFE comprised by the proposed test product A deforms in the planar direction (radial direction) while holding a load, and the compliance is greater than with a joint sheet, but is less than that with PTFE alone, so breakage, cracking, and the like can be prevented during pressing.

[ 0017 ] Table 2 below gives measurement data that show the elongation at break of the joint sheet and porous PTFE.

[ 0018 ] **Table 2**

| | Elongation at break (%) |
|---|---|
| Joint sheet | 7.5 |
| Porous PTFE | 63 |

[ 0019 ] Specifically, the elongation at break of the joint sheet comprised by the conventional test product B is only 7.5%, but the elongation at break of the porous PTFE comprised by the proposed test product A is 63%, which confirms that test product A, in which porous PTFE serves as the core, is effective for the seal of a rubber-lined flange, and that the proposed test product A provides a better seal than the conventional test products B and C when set in a PTFE-lined or rubber-lined flange.

[ 0020 ] As shown by the above results, since the cores 2, 7, and 10 of the jacket gaskets 1, 4, and 9 of the first through third practical examples, respectively, are formed from porous PTFE, and since porous PTFE has more than twice the compression of a joint sheet or PTFE alone (see Figure 5), the initial compression during sealing can be set higher, and since the cores 2, 7, and 10 formed from porous PTFE deform in the planar direction while holding a load, compliance is greater than with a joint sheet, but is less than with PTFE alone, so there is no breakage, cracking, or the like during sealing, the lining butt weld portions and the like conform better to flange surfaces having local irregularities, a good seal can be ensured with flanges having irregularities, and the sealing precision of the flange can be increased.

[ 0021 ] Furthermore, since low-density porous PTFE is used together with high-density sintered PTFE, corrosion by gas permeation, dust generation, and other such problems encountered in the past are absent, which means that this combination of materials is effective for sealing in places that must be kept clean. Also, since the entire outer surfaces of the joint gaskets 1, 4, and 9 are covered with high-density sintered PTFE, the permeation leakage of the sealed fluid can be effectively prevented.

[ 0022 ] The present invention is not limited to just the structures in the above practical examples.

Brief Description of the Figures

Figure 1 is a vertically sectioned oblique view of the jacket gasket in the first practical example;

Figure 2 is a vertically sectioned side view of the jacket gasket in the first practical example;

Figure 3 is a vertically sectioned side view of the jacket gasket in the second practical example;

Figure 4 is a vertically sectioned side view of the jacket gasket in the third practical example;

Figure 5 is a graph of the deformation of the cores comprised by the various test products;

Figure 6 is a graph of the elongation of the rubber lining layers;

Figure 7 is a vertically sectioned side view of the jacket gasket in the first conventional example;

Figure 8 is a vertically sectioned side view of the jacket gasket in the second conventional example; and

Figure 9 is a vertically sectioned side view of the jacket gasket in the third conventional example.

Key:

1, 4, and 9 ... jacket gaskets

2, 7, and 10 ... cores

3, 8, and 11 ... sheaths

5 ... sheeting

6 ... metal sheet

10a ... annular protrusion

**Figure 1**

1 and 4 ... jacket gaskets

2 and 7 ... cores

3 and 8 ... sheaths

5 ... sheeting

6 ... metal sheet

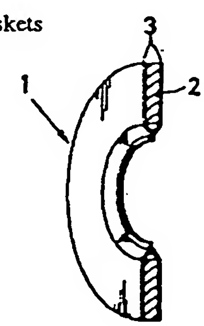


**Figure 2**

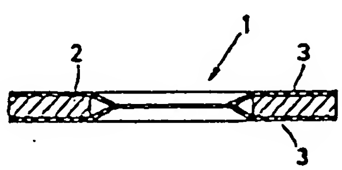


**Figure 3**

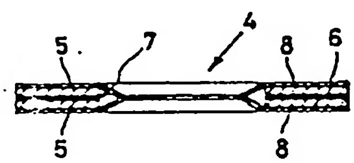


**Figure 4**

9 ... jacket gasket

10 ... core

10a ... annular protrusion

11 ... sheath

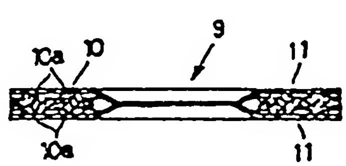

Figure 5

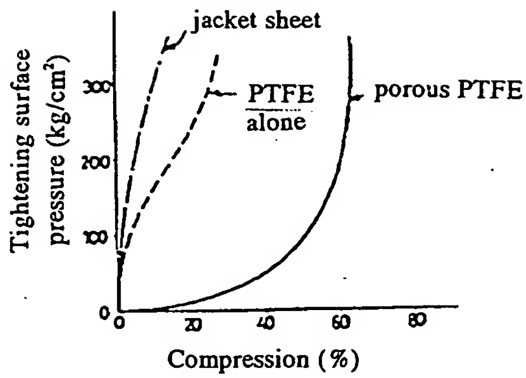


Figure 6

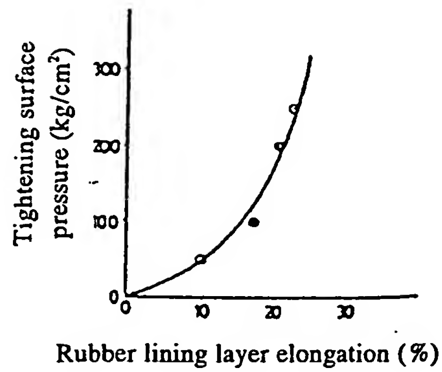


Figure 7

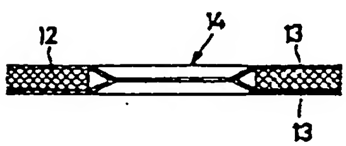


Figure 8

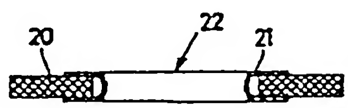


Figure 9